

SECTION 710 - FENCE AND GUARDRAIL

710.01 Barbed Wire Barbed wire shall conform to the requirements of ASTM A121, Class 3 if zinc coated or ASTM A585, Class I if aluminum coated. The wire shall be 12½ gage, 4 point round barbs wrapped around both wires, interlocked with one barb projecting through the strand and spaced 150 mm [6 in] apart or less.

710.02 Woven Wire Wire and stays shall conform to the requirements of ASTM A116, Class 3 if zinc coated or ASTM A584, if aluminum coated.

710.03 Chain Link Fabric Chain Link fabric shall conform to the requirements of AASHTO M181, Type I, Class D, or Type II.

710.04 Metal Beam Rail The rails shall conform to the requirements of AASHTO M180, Class A, Type I, or Type IV as designated.

When metal beam rail is to be installed on a curve having a radius of curvature of 45 m [150 ft] or less, the beam sections shall be fabricated on an arc to the required radius.

710.05 Cedar Rail Fence Rails and posts for cedar rail fence shall be of cedar, reasonably straight, machine or hand peeled and branch stubs cut flush.

710.06 Fence Posts and Braces Wood posts shall be of cedar, white oak, or tamarack, of the diameter or section and length shown on the plans.

Round wood posts shall be of seasoned stock straight and sound and shall have been cut from live growing trees with the outer and inner bark removed and all knots trimmed flush with the surface of the post. Rotted, loose or hollow knots, plugged or open holes will not be permitted. Sound knots will be permitted if the diameter of any one knot or the combined diameter of 2 or more knots occurring in the same cross section is not greater than one-third of the circumference of the post at that cross section. Posts shall be of uniform taper from top to bottom not to exceed 40 mm [1½ in] in taper in 2.1 m [7 ft].

The minimum diameter of heartwood in line posts at their small end shall be no less than 75 mm [3 in]. The minimum diameter of line posts at the small end shall be no less

than 75 mm [3 in]. The maximum diameter of line posts at the small end shall be 150 mm [6 in]. The minimum diameter of heartwood in end, corner, gate, and barway posts shall be 110 mm [4½ in] at the small end. The minimum diameter of end, corner, gate, and barway posts at the small end shall be 110 [4½ in]. The maximum diameter of end, corner, gate, and barway posts shall be 200 mm [8 in].

That portion of wood posts to be set below ground shall be immersed to a depth of 1200 mm [4 ft] in a tank or barrel containing an approved commercial timber preservative solution for a minimum of 60 minutes. All wood posts so treated, unless otherwise specified by the Resident, shall have been peeled and air seasoned to permit thorough drying for at least 3 months before treatment. After being treated, the posts shall be piled to permit thorough drying before being set in the ground.

Braces shall be of spruce, eastern hemlock, Norway pine, pitch pine, or tamarack timbers or spruce, cedar, or tamarack round posts of sufficient length to make a diagonal brace between adjacent posts. If other than cedar, white oak, or tamarack, braces shall be treated as described above for posts except that they shall be immersed full length.

Metal posts and braces for woven wire fence shall be of new billet steel conforming to the requirements of ASTM A615M/A615 or Commercial Standard 184-51, or shall be rail steel conforming to the requirements of ASTM A616/A616M, or ASTM A499. Posts shall be galvanized according to the requirements of AASHTO M111. Steel pipe used for woven wire fence corner posts, for rails and for bracing shall conform to the requirements of ASTM A53, galvanized.

Metal posts, rails, and bracing for chain link fence shall be as specified in AASHTO M181. Expansion sleeves, turnbuckles and other fittings and hardware shall be galvanized in accordance with the applicable requirements of ASTM A153.

710.07 Guardrail Posts Posts shall be of wood or steel.

- a. Wood posts shall be of cedar, tamarack, white oak, Norway pine, southern yellow pine, pitch pine, Douglas fir, maple, beech, birch, red pine, white pine, eastern hemlock, or red oak. They shall be of well seasoned, straight and sound timber cut from live growing trees, free from loose knots or other structurally weakening defects, including shake, holes and heart rot over 25 mm [1 in] in diameter. The posts shall be free from season checks that exceed 6 mm [¼ in] in

width. A tolerance of 25 mm [1 in] in length and 6 mm [¼ in] in width or thickness is permitted in the dimensions of rectangular posts. They shall be well sawn and have square edges except that wane not more than 38 mm [1½ in] wide and extending not more than ½ the length of the piece will be allowed on that portion of the post to be placed below ground. Sound, tight, well spaced knots to 64 mm [2½ in] diameter will be permitted.

Wood posts and offset brackets shall be preservative treated in accordance with the requirements of AASHTO M133 using pentachlorophenol or chromate copper arsenate preservative. Treatment shall be according to the Standards of AWWA C5.

Composite material blocks tested and meeting the requirements of the National Cooperative Research Program Report 350 and approved by the FHWA may be used as offset brackets.

b. Galvanized steel posts shall conform to the requirements of AASHTO M183/M183M if a rolled section or ASTM A769/A769M Grade 36 if a welded section. Fabrication will be in accordance with Section 504 - Structural Steel. Galvanizing shall be in accordance with AASHTO M111.

c. Corrosion resistant steel posts shall conform to the requirements of ASTM A769/A769M, Grade 50W if a welded section. Fabrication will be in accordance with Section 504 - Structural Steel.

710.08 Guardrail Hardware Guardrail hardware shall conform to the applicable standards contained in the latest ARTBA Bulletin No. 268B, "A Guide to Standardized Highway Barrier Rail Hardware", approved by the AASHTO-ARTBA-AGC Joint Cooperative Committee, Technical Bulletin Number 268-B.

All galvanized fittings, bolts, washers, twisted end section anchors and other accessories shall be in accordance with the requirements of AASHTO M111, M232 or AASHTO M298, Class 50, Type I, whichever applies. All galvanizing shall be done after fabrication.

Hardware for corrosion resistant guardrail shall be in accordance with ASTM A325M/A325, Type 3, except the 400 mm [16 in] bolts and nuts for attaching the metal beam rail to the posts, which may be galvanized as specified above.